

# **The Bill Blackwood Law Enforcement Management Institute of Texas**

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## **Forensic Facial Imaging: Forensic Art vs. Computer Software**

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### **A Leadership White Paper Submitted in Partial Fulfillment Required for Graduation from the Leadership Command College**

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## **ABSTRACT**

Forensic art is relevant to contemporary law enforcement because it gives all investigators an extremely valuable tool to use in the area of identification. Another tool that is available to investigators is the use of computer software systems for identification. The position of the researcher is that forensic art has proven to be a better tool overall in assisting with the investigation of identification than computer generated facial composites due to its having a wider range of use, cost effectiveness, accuracy, and ease of use. The following are the types of information used to support the researcher's position: books, magazine articles, journals, papers, and websites.

The conclusion drawn from this position paper is that law enforcement investigators will benefit more from learning about and using forensic art over computer generated composites and software for craniofacial identification. Forensic art is more cost efficient and more secure as evidence for court. It also has more applications available, more mobility, and more training available. Law enforcement is slowly expanding to handle more issues with the public and will inevitably be subjected to changes in technology. Although new technology is and has in the past proven itself to be useful, some things cannot compete with tried and proven techniques.

## TABLE OF CONTENTS

	Page
Abstract	
Introduction . . . . .	1
Position . . . . .	2
Counter Position . . . . .	6
Conclusion . . . . .	9
References . . . . .	13

## INTRODUCTION

The topic of this paper is how forensic art, when performed by a trained forensic artist, is more reliable, more effective, and can be used more diversely than computer software programs created to perform the same functions. Both techniques are used to assist with the forensic facial identification of unknown or unidentified subjects. The advantages and disadvantages of each system will be explained in this paper.

The reason for taking the position of forensic art over computer software is to educate police personnel on the advantages of forensic facial identification and provide information on the use of forensic art in an investigative setting. This paper also intends to show that while computer software may be useful in some settings, it is not overly cost effective for departments of all sizes and does not have the same capabilities as an artist.

In 2001, Taylor stated, "It is incumbent upon all who bear the responsibilities of criminal investigations and prosecutions to understand more about forensic art" (p. 3). Many feel forensic art is without merit and more closely related to "voodoo" than an actual scientific method. As an alternative, computer software was created as it was thought this would do a better job at providing a more realistic image and would be more widely accepted by investigators and other police personnel. Although computer software has met with some success, there is no software that can compare with an artist formally trained in forensic art techniques. Additionally, forensic art has now been recognized by the International Association for Identification (IAI) as a science-based forensic discipline.

Forensic art has proven itself time and again to be a better tool overall to assist in investigation of identification. As this paper will show, forensic art has more capabilities and diversity to aid in a wide range of identification areas such as composite art, age progression work, and skeletal remains identification. In addition, computer generated composites are less likely to work as effectively due to the picture-like quality of the final product, cost, difficulty of use for each software, and the ability to change the final image after submission for evidence. These are a few of the reasons computer generated facial composites are inferior to the final product of the forensic artist.

## **POSITION**

Forensic art as a whole is a better overall tool for aiding with the identification of a subject in an investigation. Art has been used to help with criminal matters since the 1800s. As with any other discipline, the field has grown in leaps and bounds since its inception. Computer imaging software has only been around since the 1970s. That is 40 years as compared to a hundred plus years. In that hundred plus years, forensic art has been refined in its entirety and has grown in its capabilities, whereas computer software, although successful in some circumstances, is limited and relies on too many variables. In 2005, Frowd et al. stated "The composite sorting data provide further evidence that the computerized systems tested perform equivalently, but are poorer than the manually generated sketches" (p. 1).

Forensic art has proven itself more diverse in investigations in that it has more functionality than computer software. A trained forensic artist is able to perform a wider array of tasks in the forensic facial imaging field. Computer software has been designed to perform basic composite sketches, age progression, and 3-dimensional

reconstructions. Forensic artists can perform all these functions as well as age digression, post-mortem sketches, and 2-dimensional reconstructions. Not only can artists do more, they can do them without limitations to subtle touches that keep sketches more human and less alien. According to Levi and Chaikovsky (2007), "Software does not have the flexibility of an artist to make subtle changes that create a more realistic or lifelike appearance in facial composites" (p. 2).

One of the main problems facing departments right now is budgetary concerns. Any investigative tool is going to cost money, especially when it comes to technology. Getting a forensic artist fully trained will cost less than \$1,000.00, including the tools to do the job (<http://www.scottsdaleartschool.org/>). After researching four different software systems, it was found that proven software costs more and only includes training for one person. Most of the websites fail to clearly state there is a yearly maintenance fee for as long as a department uses the system. In addition, each package only contains a certain number of facial features and traits per ethnic race. Additional traits and facial features are sold in extra packages as are updates to the software. Jackson (2007) concluded, "The most distinct failings though, of mostly all mechanical processes, are the lack of facial features and the costs to run or access the systems" (p. 1). In addition, the computers that are used for these programs must have a certain amount of memory available to utilize the software, which can increase costs even more.

Among the several limitations that computer composite software has is the issue of mobility. As software can only be used with a computer, a computer can only be used with electricity. Some witnesses or victims may not be able to go to the

department where the computer is housed or may not feel comfortable in that atmosphere, and even if the computer is a mobile laptop, there may be no access to electricity where the victim or witness is able to give the information. This means the operator of the program must rely on the reserve battery length. This is a problem as there is no set time limit to complete a composite, but all batteries have a determinate amount of time they will run a computer. A forensic artist has only to carry paper, drawing tools, and a few thin reference books. Due to the diminutive amount of implements an artist needs, mobility for the artist is only limited by where he or she is allowed to go by his or her department.

As with any tool used in investigation, someone must be trained in the use of the tool. Techniques used for forensic art can be taught to anyone who shows minimal skills in drawing and interviewing. Nationwide, there are many places one can receive quality training in forensic art basics. Several colleges across the country, including Northwestern University, offer in-depth courses for training new artists. The basis for training artists encompasses two main areas that are absolutely necessary to obtain a sketch with a reasonable likeness of the subject. First, there are a concrete knowledge and use of interview skills. Interview skills are more important than the actual artistic ability as this is where the artist retrieves the information needed to get a result. Next, there is developing artistic talent. If an officer or civilian has medial talent in this area, then all that is left is to polish and enhance what is already there. Computer composite software is more complicated and, thus, requires more training to effectively operate the system. Not only does the user need training in advanced computer skills but also extensive training on the specific program to be used. Along with this, the individual still

may require a certain amount of training in art and interview skills.

The final product of both the forensic artist and the computer generated composites are considered to be evidence in court proceedings. The forensic artist and the computer software operator may both be subpoenaed to court to testify in regards to their involvement in a composite. As is common practice when dealing with any form of evidence, there must be safeguards to ensure against tampering. A manually generated sketch is often sprayed with a fixative so it may not be changed or disturbed in any way once the witness or victim has decided on a positive final product. The fixative acts as a “finish coat” on the completed sketch. Once the fixative is dry or cured, further attempts to mark or draw on the sketch cannot occur. The graphite from the pencil or pastel chalk will not adhere to the fixative and will not stay on the paper. It would be akin to drawing on wax paper.

Computer images are most often kept in files and stored on a computer, server, or removable thumb drives. Computers can be “hacked” by outside sources, suffer lost information from computer viruses, and can have crashed hard drives which terminates most everything on the computer. There are many programs and software available for purchase for the sole purpose of manipulating images. Levi and Chaikovsky (2007) discussed changing the final product and showed the reader how to do this. They stated in the abstract of the paper, “This paper describes how to use Adobe Photoshop to make corrections and additions to software-generated composites” (Levi & Chaikovsky, 2007, p. 1). Due to anyone other than the original operator having the ability to change the final product, more problems can occur with the admissibility of the evidence and testimony of the operator. In essence, this could potentially give the defense attorney



more avenues to attack the credibility of the completed composite and of the operator of the software.

## **COUNTER POSITION**

Law enforcement agencies who are using or have used computer composite imaging software may believe the software to be a superior tool for several reasons. The end product of most software is more realistic and detailed than most artists can deliver to the investigator. When the composite image is completed by personnel trained to operate the software, the result has a picture-like quality. The down side to this is that people who are looking at the resulting image tend to look for someone who looks exactly like the image, instead of similarities. Tom Macris was the forensic artist for the San Jose, California police department who co-invented one of the first computerized composite software programs to be used regularly called "Compusketch." According to Macris (1987), one significant advantage a composite sketch has over a photo is that "when viewing a computerized composite sketch, one is forced to apply a very fruitful margin for interpretation" (p. 4). Macris (1987) further observed that an experienced police artist "knows that the addition of superfluous detail is an overkill which defeats the purpose of the composite sketch" (p. 4).

Part of the success of the sketch is the interpretation people use after viewing the sketch. This gives investigators many more leads than a printing of a "photograph." When viewing a photograph, most people will be looking for an exact match and may discount someone who looks similar, but not absolutely like the photo. When a manual sketch is distributed for viewing, people interpret it in different ways, which develops more avenues the investigator may follow and also increases the likelihood of a

successful identification of the subject. More leads are definitely preferable.

A statement that has often been made when discussing art versus computer composites is that computer composite images are more likely to produce a positive identification due to technological advances in computer software. In a 2005 comparison between several different computerized systems and manual sketches to determine positive results, Frowd et al. found “They reported the best naming for E-FIT and PROfit (composites were correctly named about 20% of the time), followed by artist’s sketches (10%), Photofit (5%), and EvoFIT (3.5%)” (p. 1). A study completed prior to the Frowd et al. (2005) report was done with a group of college students. The study took these students and had them prepare, from memory, composites of other high school students and faculty with trained personnel using Mac-a-Mug Pro software. Other students, who had attended the same high school, could not recognize any of the composites. Kovera, Penrod, Pappas, and Thill (1997) stated, “The results (of this study) raise questions about efficacy of composite systems as tools to promote recognition of suspects in criminal contexts” (p. 1), thus refuting Frowd et al. (2005).

Almost all of the success or failure of the completed sketch depends on how much the witness or victim can actually recall in regards to facial recognition. An ongoing argument between believers and non-believers in forensic art is whether or not the witness’s memory is being inadvertently altered by the use of reference photographs and visual cues. There are those who feel when a forensic artist uses photographs of different facial features to help with recalling events and individual details about a face, it can significantly alter the original memory and, in some instances, can introduce false components to the sketch.

Jenkins and Davies (1985) did a study of the contamination of facial memory through exposure to misleading pictures. They took a group of college students and had them witness an event. They then provided misleading pictures to see if it would alter the students' recollection of those involved. According to Jenkins and Davies (1985), "Subjects who observed a composite containing misleading information—either incorrect hair or an added moustache—were significantly more likely to misreport hairstyle ( $p < .001$ ) and presence of a moustache ( $p < .001$ ) than those who did not" (p. 1). Although there are instances where photographs can have a negative effect on witness memory, it is much more likely that these references will aid with not only recalling events and details of the event but also with the facial features of the subject to be identified.

Recalling details from the absence of any stimulus becomes a severe roadblock in the interview process and must be overcome. Providing stimuli as a cue for the victim or witness enhances the probability the details will return to memory. Memory specialist Dr. Larry Cahill was asked about composite artists using reference photographs to aid in recall, and he indicated, "Composite artists should definitely make use of recognition memory, since it is much easier than free recall for individuals of all ages" (as cited in Taylor, 2001, p. 148). Cahill went on to cite "a study in which 10,000 photographs were shown to individuals and 70 to 80% were recognized by the test subjects pointing up the amazing capacity of the human brain to sort visual images" (as cited in Taylor, 2001, p. 148). This study sums up the fact that people tend to respond better to holistic or overall images, rather than pieces and parts individually shown. Reference cues aid in facilitating recognition of some aspects of similarities between the

reference and the actual memory itself and do not indicate the memory and the reference material are exactly the same.

## **CONCLUSION**

Forensic art has not always received its proper credit, largely due to most people not understanding or taking the time to learn about this particular forensic discipline. The study of DNA was around for a while before it became accepted as part of many investigations. Today, few people actually understand what all is involved but still accept and even expect its presence as evidence. The study of forensic art has been around for longer than DNA study, yet it is still considered almost like witchcraft. Sketches have been used countless times with positive results over the years, going back as early as 1881 with a “wanted” poster of accused murderer Percy Mapleton. Investigators are trained to be objective, and in keeping with that practice, should learn more about forensic art and other “strange” disciplines before discounting it as unusable or outside normal avenues of investigations.

Even though craniofacial identification makes up the majority of what the forensic artist does, the discipline as a whole has much more diversity to reach that goal than what is available in computer software. In a manually generated sketch, there are few limits as to what is possible as long as the artist has been properly trained. Although computer composite software operators receive adequate training in the particular software purchased by their department, they are limited to what they can do with the program. Frowd et al. (2005) supported this with their research comparing four different computer software systems. It appears that Photofit and Identikit composites are poor quality and insensitive to the manipulations that normally give rise to change in the

laboratory (as cited in Frowd et al., 2005). Furthermore, the more flexible computerized systems such as Mac-A-Mug Pro and E-FIT are theoretically better; however, performance remains disappointing when composites are constructed from memory (as cited in Frowd et al., 2005). Computer programs rely mostly on memory and very little on photographic references. Software systems that perform post-mortem composites are not available, and systems used for 3-dimensional reconstructions are pricey and difficult to use without advanced computer knowledge. Also, software is used quite extensively in age progression work.

The old saying is “you get what you pay for,” but one area where that saying is invalid is composites used for identification. With forensic art, a department gets more than what it pays for. This invaluable resource will incur a one-time cost to a department, aside from purchasing more pencils and paper, unlike computer software which comes with annual fees, costly updates, and only part of the system needed for the various details one needs to complete a composite. Departments should really weigh both options before deciding to purchase an expensive software system. Some departments may not have a regular need for composites, so it would be more cost effective to go outside the agency and hire a freelance forensic artist. This would keep the department from using funds unnecessarily, and it would give the investigators a chance to learn more about forensic art.

When determining which would be better for a department, administration should consider mobility. As law enforcement is always striving for better service, departments must branch out from the standard ways of providing service. Computer composite systems have mobility limitations that are not an issue with forensic artists. Artists

generally keep all materials needed in one medium sized bag. A palette and a collapsible stand are the only other items needed outside the bag. Software needs computers, and this limits where the interview can take place.

Training is important to the profession of law enforcement. Most departments have a training budget that must cover all training for the year. If a training coordinator could get an officer fully trained in a valuable skill with a one time fee or another officer partially trained in a valuable skill with a recurring fee, the choice would be an easy one to make. The main idea is to get the most and best product for the money available. A forensic artist has to be trained once to produce results. Computer programs are approximately the same price initially, but they have maintenance fees for as long as the agency owns the system. In addition, the program only includes a limited amount of facial features, which may exclude the ones that are needed in a particular composite.

The end result of both computer software and a forensic artist will be considered evidence in many cases. This is especially true when the subject to be identified is the perpetrator of a crime. Evidence must follow a chain of custody and must be secured so as not to allow alteration. Computer generated composites are stored in computers, but computers can be hacked or damaged. If this happens to a computer that is storing evidence, the evidence is then lost or inadmissible. The final product for the artist can more easily be secured as evidence as easily as any other document.

Forensic art has weathered many years of scrutiny and is still around for use in several areas of identification. Computers can certainly complete many processes faster, and they still have the potential to grow and mature in areas where there is currently room for improvement. The information provided in this paper shows that no

software system can match the skills of a trained forensic artist in the scientific field of forensic craniofacial identification.

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